Air Resources Board

John D. Dunlap, III, Chairman
2020 L Street · P.O. Box 2815 · Sacramento, California 95812 · www.arb.ca.gov

Peter M. Rooney
Secretary for Environmental Protection

Pete Wilson
Governor

March 3, 1997

Mr. Jon Young, President
Hasstech
6985 Flanders Drive
San Diego, California 92121

Dear Mr. Young:

EPA 301 Comparison Testing of VacuSmart and VacuCheck with CARB TP201.5 at a Facility with a Gilbarco VaporVac System

Thank you for your patience and assistance in conducting the equivalency tests for the Hasstech (A/L) instruments. Based on the results described in the enclosed summary of the report by John Gray of your staff, we approve the VacuCheck and VacuSmart procedures as alternatives to CARB TP-201.5, when applied to a Gilbarco VaporVac system as described in CARB Executive Order #G-7150-AD.

To briefly summarize the report, comparison testing was performed using two levels of flow restriction in the front end hardware hanging at a facility with a Gilbarco VaporVac. VacuCheck and VacuSmart passed their U.S. EPA Method 301 comparison tests with TP201.5 for both levels of restriction.

Please contact Cindy Castronovo at (916) 263-1628 if you need further assistance.

Sincerely,

William V. Loscutoff, Chief
Monitoring and Laboratory Division

Enclosure

cc: Jim Morgester, Chief
Compliance Division

Jim Johnson, Chair
CAPCOA Vapor Recovery Committee

EPA 301 Comparison Testing of VacuSmart and VacuCheck with CARB TP201.5 at a Facility with a GilbarcoVaporVac System

Introduction:

In 1996, Hasstech requested an evaluation of its VacuSmart and VacuCheck instruments as alternatives to the procedures contained in ARB TP-201.5 "Determination (by Volume Meter) of Air to Liquid Volume Ratio of Vapor Recovery Systems of Dispensing Facilities"

Section 13 of TP 201.5 "ALTERNATIVE TEST PROCEDURES" essentially states that such alternatives shall only be used with written approval from the ARB Executive Officer. The applicant is responsible for satisfying the ARB Executive Officer that the alternative certification procedure is equivalent to the subject test procedure.

ARB Testing Section staff agreed to conduct side-by-side tests of TP-201.5 to evaluate the Hasstech instruments using U.S. EPA Method 301 as a basis for equivalency determination.

Test Method:

EPA Method 301 provides four categories of procedures for determining precisions and biases which can be used to decide issues of equivalency between validated and alternative test procedures. The four general categories are:

(1) Isotopic Spiking

(2) Comparison Against a Validated Test Method

(3) Analyte Spiking

(4) Probe Placement and Arrangement for Stationary Source Stack or Duct Sampling

Only the second category applies here. Each test requires comparison runs of the validated test method and the alternative test method. Nine paired runs are required for each vapor recovery system mode.

Comparison testing was performed in two system modes using two levels of restriction to flow in the front end hardware hanging at a facility with a Gilbarco VaporVac. This was achieved by, for instance, hanging a long narrow hose to get high restriction or a short wide hose to get low restriction.

Finally, each test mode was run for three different times; for the time it took to dispense two, three, and four gallons.

Per the rules of EPA 301, the test runs were organized into pairs of runs. Because TP-201.5 was run each time with one or more comparison runs, at least one data pair was extracted per run of TP-201.5.

Per the rules of EPA 301, the test pairs were subjected to precision and bias testing at the ninety-fifth percent confidence level with the following criteria:

(1) Percision:

(a) If the F statistic is less than or equal to 3.44, then the precisions are adequately equal.

(b) If the F statistic is greater than 3.44, then the candidate procedure fails.

(2) Bias:

(a) If the t statistic is less than or equal to 1.397, then no Correction Factor is needed.

(b) The Correction Factor is the (Validated Value) / (Candidate Value).

(c) If a Correction factor is at or inside the range 0.9 to 1.1, the candidate procedure passes.

(d) If a Correction Factor is outside the range 0.9 to 1.1, the candidate procedure fails.

Test Results

VacuSmart and VacuCheck passed their comparison tests with TP201.5 for both levels of restriction and at three volumetric flow rates per EPA 301 on a Gilbarco VaporVac.

F = F statistic
t = t statistic
CF = Correction Factor
VS = VacuSmart
VC = VacuCheck

Low Restriction

	VS 2 gallon	VS 3 gallon	VS 4 gallon	VC 2 gallon	VC 3 gallon	VC 4 gallon
F	1.81	0.17	0.37	0.91	1.96	1.49
t	9.832	10.012	2.100	5.979	5.834	10.573
CF	0.956	0.978	0.993	1.024	1.037	1.049
	pass	pass	pass	pass	pass	pass

High Restriction

	VS 2 gallon	VS 3 gallon	VS 4 gallon	VC 2 gallon	VC 3 gallon	VC 4 gallon
F	0.47	0.31	0.19	1.25	0.38	0.13
t	10.588	8.770	7.204	0.613	1.605	6.860
CF	0.918	0.943	0.963	1.000	1.012	1.032
	pass	pass	pass	pass	pass	pass

EPA Correction Factor Averages

	VS 2 gallon	VS 3 gallon	VS 4 gallon	VC 2 gallon	VC 3 gallon	VC 4 gallon
CF	0.937	0.961	0.978	1.012	1.025	1.041
	pass	pass	pass	pass	pass	pass